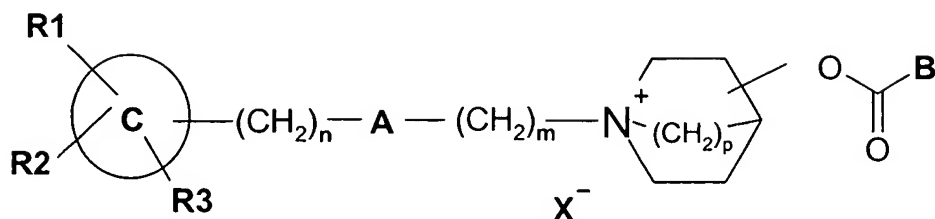


# CLAIMS

1. A compound according to formula (I)

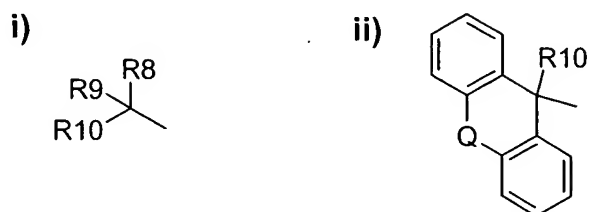
(I)



5 wherein:

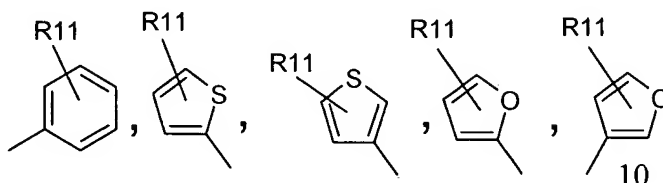
- © is a phenyl ring, a C<sub>4</sub> to C<sub>9</sub> heteroaromatic compound containing one or more heteroatoms or a naphthalenyl, 5,6,7,8-tetrahydronaphthalenyl or biphenyl group;
- R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each independently represent a hydrogen atom or  
 10 halogen atom, or a hydroxy group, or a phenyl, -OR<sup>4</sup>, -SR<sup>4</sup>, -NR<sup>4</sup>R<sup>5</sup>, -NHCOR<sup>4</sup>, -CONR<sup>4</sup>R<sup>5</sup>, -CN, -NO<sub>2</sub>, -COOR<sup>4</sup> or -CF<sub>3</sub> group, or a straight or branched lower alkyl group which may optionally be substituted, for example, with a hydroxy or alkoxy group, wherein R<sup>4</sup> and R<sup>5</sup> each independently represent a hydrogen atom,  
 15 straight or branched lower alkyl group or together form an alicyclic ring; or R<sup>1</sup> and R<sup>2</sup> together form an aromatic, alicyclic or heterocyclic ring,
- n is an integer from 0 to 4;
- A represents a -CH<sub>2</sub>-, -CH=CR<sup>6</sup>-, -CR<sup>6</sup>=CH-, -CR<sup>6</sup>R<sup>7</sup>-, -CO-, -O-, -S-,  
 20 -S(O)-, SO<sub>2</sub> or -NR<sup>6</sup>- group, wherein R<sup>6</sup> and R<sup>7</sup> each independently represent a hydrogen atom, straight or branched lower alkyl group or R<sup>6</sup> and R<sup>7</sup> together form an alicyclic ring;
- m is an integer from 0 to 8; provided that when m = 0, A is not -CH<sub>2</sub>-;
- 25 p is an integer from 1 to 2 and the substitution in the azoniabicyclic ring may be in the 2, 3 or 4 position including

all possible configurations of the asymmetric carbons;  
B represents a group of formula i) or ii):





(I)

- 5 wherein R<sup>10</sup> represents a hydrogen atom, a hydroxy or methyl group;  
and R<sup>8</sup> and R<sup>9</sup> each independently represent



- wherein R<sup>11</sup> represents a hydrogen or halogen atom or a straight  
or branched lower alkyl group and Q represents a single bond, -  
CH<sub>2</sub>-, -CH<sub>2</sub>-CH<sub>2</sub>-, -O-, -O-CH<sub>2</sub>-, -S-, -S-CH<sub>2</sub>- or -CH=CH-; and  
X represents a pharmaceutically acceptable anion of a mono or  
15 polyvalent acid.

2. A compound according to claim 1, wherein any alkyl  
group present as R<sup>1</sup> to R<sup>7</sup> or R<sup>11</sup> contains from 1 to 4 carbon  
atoms.
3. A compound according to claim 1 or 2 wherein p=2.
- 20 4. A compound according to any one of the preceding  
claims wherein  represents a phenyl, pyrrolyl, thienyl, furyl,  
biphenyl, naphthalenyl, 5,6,7,8-tetrahydronaphthalenyl,  
benzo[1,3]dioxolyl, imidazolyl or benzothiazolyl group.
5. A compound according to claim 4, wherein 
- 25 represents a phenyl, pyrrolyl or thienyl group.
6. A compound according to any one of the preceding

claims wherein  $R^1$ ,  $R^2$  and  $R^3$  each independently represent a hydrogen or halogen atom or a hydroxy, methyl, tert-butyl, -CH<sub>2</sub>OH, 3-hydroxypropyl, -OMe, -NMe<sub>2</sub>, -NHCOMe, -CONH<sub>2</sub>, -CN, -NO<sub>2</sub>, -COOMe or -CF<sub>3</sub> group.

5        7. A compound according to claim 6 wherein  $R^1$ ,  $R^2$  and  $R^3$  each independently represent a hydrogen or halogen atom or a hydroxy group.

8. A compound according to claim 7, wherein the halogen atom is fluorine.

10       9. A compound according to any one of the preceding claims wherein A represents a -CH<sub>2</sub>-, -CH=CH-, -CO-, -NH-, -NMe-, -O- or -S- group; n is 0 or 1; and m is an integer from 1 to 6.

10. A compound according to claim 9, wherein A represents a -CH<sub>2</sub>-, -CH=CH- or -O- group and m is 1, 2 or 3.

15       11. A compound according to any one of the preceding claims wherein the azoniabicyclo group is substituted on the nitrogen atom with a 3-phenoxypropyl, 2-phenoxyethyl, 3-phenylallyl, phenethyl, 3-phenylpropyl, 4-phenylbutyl, 3-(2-hydroxyphenoxy)propyl, 3-(4-fluorophenoxy)propyl, 2-  
20 benzyloxyethyl, 3-pyrrol-1-ylpropyl, 2-thien-2-ylethyl or 3-thien-2-ylpropyl group.

12. A compound according to any one of the preceding claims wherein B represents a group of formula (i) and  $R^8$  and  $R^9$  each independently represent a phenyl, 2-thienyl, 3-thienyl, 2-  
25 furyl, or 3-furyl group and  $R^{11}$  represents a hydrogen atom.

13. A compound according to any one of claims 1 to 11, wherein B represents a group of formula (ii) and Q represents a single bond, a -CH<sub>2</sub>-, -CH<sub>2</sub>-CH<sub>2</sub>- group or an oxygen atom.

14. A compound according to any one of the preceding  
30 claims wherein X represents a bromide, chloride or trifluoroacetate anion.

15. A compound according to any one of the preceding claims wherein the azoniabicyclo group is substituted in the 3-

position.

16. A compound according to claim 15, wherein the substituent in the 3 position has (R) configuration.

17. A compound according to claim 16, wherein R<sup>8</sup> is different from R<sup>9</sup> in group i), and the asymmetric carbon to which R<sup>8</sup> and R<sup>9</sup> are bonded has the (R) configuration.

18. A compound according to claim 16, wherein R<sup>8</sup> is different from R<sup>9</sup> in group i), and the asymmetric carbon to which R<sup>8</sup> and R<sup>9</sup> are bonded has the (S) configuration.

19. A compound according to any one of the preceding claims which is a single isomer.

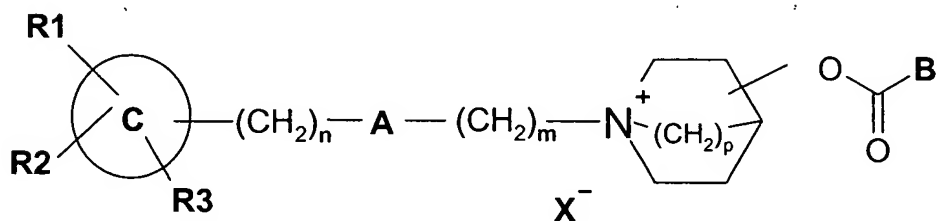
20. A compound according to claim 1 which is  
3(R)-Diphenylacetoxy-1-(3-phenoxy-propyl)-1-  
azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Hydroxy-2,2-diphenyl-acetoxy)-1-(3-phenoxypropyl)-1-  
azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2,2-Diphenylpropionyloxy)-1-(3-phenoxypropyl)-1-  
azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Hydroxy-2-phenyl-2-thien-2-yl-acetoxy)-1-(3-  
phenoxypropyl)-1-azonia-bicyclo[2.2.2]octane; bromide  
3(R)-(2-Furan-2-yl-2-hydroxy-2-phenylacetoxy)-1-(3-phenylallyl)-  
1-azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Furan-2-yl-2-hydroxy-2-phenylacetoxy)-1-(2-phenoxyethyl)-  
1-azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Furan-2-yl-2-hydroxy-2-phenylacetoxy)-1-(3-  
phenoxypropyl)-1-azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2,2-Dithien-2-ylacetoxy)-1-(3-phenoxypropyl)-1-  
azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Hydroxy-2,2-di-thien-2-ylacetoxy)-1-phenethyl-1-  
azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Hydroxy-2,2-di-thien-2-ylacetoxy)-1-(4-phenylbutyl)-1-  
azoniabicyclo[2.2.2]octane; bromide  
3(R)-(2-Hydroxy-2,2-dithien-2-ylacetoxy)-1-(3-phenoxypropyl)-1-

azonia-bicyclo[2.2.2]octane; bromide  
 1-[3-(4-Fluorophenoxy)propyl]-3(R)-(2-hydroxy-2,2-dithien-2-ylacetox-  
 y)-1-azoniabicyclo[2.2.2]octane; chloride  
 3(R)-(2-Hydroxy-2,2-dithien-2-ylacetox)-1-[3-(2-hydroxyphenoxy)pro-  
 5 pyl]-1-azoniabicyclo[2.2.2]octane; trifluoroacetate  
 3(R)-(2-Hydroxy-2,2-dithien-2-ylacetox)-1-(3-pyrrol-1-ylpropyl)-  
 1-azonia-bicyclo[2.2.2]octane; trifluoroacetate  
 3(R)-(2-Hydroxy-2,2-dithien-2-ylacetox)-1-(2-thien-2-ylethyl)-1-a-  
 zoniabicyclo[2.2.2]octane; bromide  
 10 3(R)-(2-Hydroxy-2,2-dithien-2-ylacetox)-1-(3-thien-2-ylpropyl)-1-  
 a zoniabicyclo[2.2.2]octane; bromide  
 1-(2-Benzoyloxyethyl)-3(R)-(2-hydroxy-2,2-dithien-2-ylacetox)-1-a  
 zoniabicyclo[2.2.2]octane; trifluoroacetate  
 3(R)-(2-Hydroxy-2,2-dithien-3-ylacetox)-1-(3-phenoxypropyl)-1-a-  
 15 zoniabicyclo[2.2.2]octane; bromide  
 1-(3-phenylallyl)-3(R)-(9-Hydroxy-9[H]-fluorene-9-carbonyloxy)-1-  
 azoniabicyclo[2.2.2]octane; bromide  
 3(R)-(9-Hydroxy-9[H]-fluorene-9-carbonyloxy)-1-(3-phenoxypropyl)-  
 1-azoniabicyclo[2.2.2]octane; bromide  
 20 3(R)-(9-Hydroxy-9[H]-fluorene-9-carbonyloxy)-1-phenethyl-1-azonia  
 bicyclo[2.2.2]octane; bromide  
 3(R)-(9-Hydroxy-9H-fluorene-9-carbonyloxy)-1-(3-thien-2-ylpropyl)-  
 1-azoniabicyclo[2.2.2]octane; bromide  
 3(R)-(9-Methyl-9[H]-fluorene-9-carbonyloxy)-1-(3-phenylallyl)-1-a-  
 25 zonia bicyclo[2.2.2]octane; bromide  
 3(R)-(9-Methyl-9[H]-fluorene-9-carbonyloxy)-1-(3-phenoxypropyl)-1-  
 azo niabicyclo[2.2.2]octane; bromide  
 1-(4-Phenylbutyl)-3(R)-(9[H]-xanthene-9-carbonyloxy)-1-azoniabicy-  
 clo [2.2.2]octane; bromide  
 30 1-(2-Phenoxyethyl)-3(R)-(9[H]-xanthene-9-carbonyloxy)-1-azoniabicy-  
 clo [2.2.2]octane; bromide  
 1-(3-Phenoxypropyl)-3(R)-(9[H]-xanthene-9-carbonyloxy)-1-azoniabi-  
 cyclo [2.2.2]octane; bromide

- 1-Phenethyl-3(R) - (9[H] -xanthene-9-carbonyloxy) -1-azoniabicyclo[2.2.2] octane; bromide  
 3(R) - (9-Hydroxy-9[H] -xanthene-9-carbonyloxy) -1- (3-phenoxypropyl) -  
 1- azoniabicyclo[2.2.2]octane; bromide  
 5 3(R) - (9-Hydroxy-9[H] -xanthene-9-carbonyloxy) -1-phenethyl-1-azonia  
 bicy clo[2.2.2]octane; bromide  
 3(R) - (9-Hydroxy-9H-xanthene-9-carbonyloxy) -1- (3-thien-2-ylpropyl) -  
 -1-azoniabicyclo[2.2.2]octane; bromide or  
 3(R) - (9-Methyl-9[H] -xanthene-9-carbonyloxy) -1- (3-phenoxy-propyl) -  
 10 1-azonia-bicyclo[2.2.2]octane; bromide

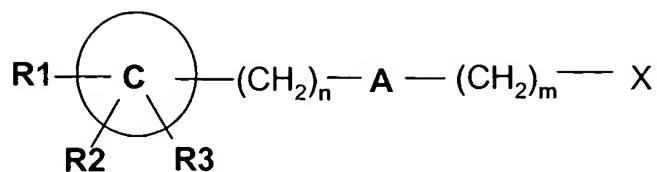
21. A compound according to any one of the preceding  
 claims characterised in that it has an  $IC_{50}$  value for muscarinic  
 $M_3$  receptors (Hm3) of less than 35 nM.

22. A process for the preparation of a compound of formula  
 15 (I)



(I)

which comprises reacting an alkylating agent of formula (II)

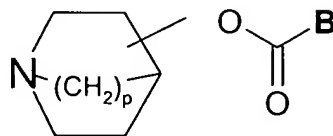


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(II)

with a compound of formula (III)

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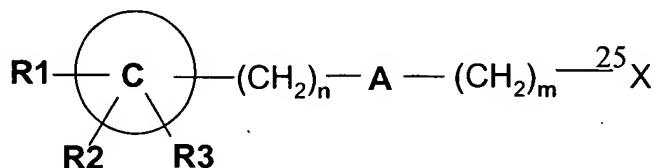
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(III)

wherein, in each of formulae I, II and III,  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$ ,  $\text{C}$ , A, X, B, n, m and p are as defined in any one of claims 1 to 20.

23. A process according to claim 22 characterised in that  
20 the resulting reaction mixture is purified by solid phase extraction.

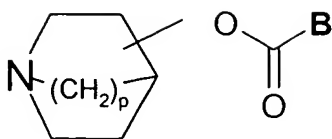
24. A compound of formula (II)



(II)

30 wherein  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$ ,  $\text{C}$ , A, X, n and m are as defined in any one of claims 1, 2, 4 to 11, 14 or 20.

25. A compound of formula (III)



5

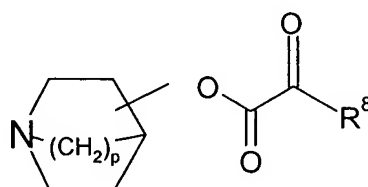
(III)

wherein B and p are as defined in any one of claims 1 to 3, 12, 13 or 15 to 20, and having the (R)- configuration.

- 10 26. A compound according to claim 25 which is  
 9-Methyl-9[H]-fluorene-9-carboxylic acid 1-azabicyclo[2.2.2]oct-3(R)-yl ester;  
 9-Methyl-9[H]-xanthene-9-carboxylic acid 1-azabicyclo[2.2.2]oct-3(R)-yl ester;  
 2-Hydroxy-2,2-difuran-2-yl-acetic acid 1-azabicyclo[2.2.2]oct-3(R)-yl ester.

15

27. A compound of formula (VII)



20

(VII)

wherein p and R<sup>8</sup> are as defined in any one of claims 1 to 3 or 12.

25

28. A compound according to claim 27, wherein R<sup>8</sup> is a 2-thienyl or 2-furyl group.

29. A compound according to claim 27 which is  
 Oxothien-2-yl-acetic acid 1-azabicyclo[2.2.2]oct-3(R)-yl ester;  
 or Oxofuran-2-yl-acetic acid 1-azabicyclo[2.2.2]oct-3(R)-yl ester.

30

30. Use of a compound according to any one of claims 24 to 29 in a process for producing a compound of formula (I) as defined in any one of claims 1 to 20.

31. A pharmaceutical composition comprising a compound according to any one of claims 1 to 21 in admixture with a pharmaceutically acceptable carrier or diluent.

5 32. A compound according to any one of claims 1 to 21, or a pharmaceutical composition according to claim 31 for use in a method of treatment of the human or animal body by therapy.

33. Use of a compound according to any one of claims 1 to 21, or a pharmaceutical composition according to claim 31 for the manufacture of a medicament for use in the treatment of  
10 respiratory, urinary or gastrointestinal disease.

34. Use of a compound according to any one of claims 1 to 21 or a pharmaceutical composition according to claim 31 for the manufacture of a medicament for use in the treatment of COPD, chronic bronchitis, asthma and rhinitis.

15 35. A method for treating respiratory, urinary and/or gastrointestinal disease which method comprises administering to a human or animal patient in need of such treatment an effective amount of a compound according to any one of claims 1 to 21 or of a pharmaceutical composition according to claim 31.

20